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Twice implicit scheme with accuracy control and it application to chemical kinetics problems

This report is about construction of the difference scheme for numerical solution of stiff systems of ODE's. The aim is to build absolutely stable numerical method with high order of approximation. In this work the twice implicit A-stable difference scheme with sixth order of approximation is offered. The other goal is automatic choice of integration step of difference scheme which is calculated from proposed scheme and from one step scheme of fourth order of approximation. The algorithm was tested by means of chemical kinetics problem. Behaviour of gas explosive mixture ($H_2 + O_2$) in closed volume with moving piston is considered. It was found possibility to decrease a dangerous pollutions at atmosphere from engine working on hydrogen.